Modelling Sustainable Systems and Semantic Web

Information and Language

Lecture in the Module 10-202-2312
for Master Computer Science

Prof. Dr. Hans-Gert Gräbe

`http://www.informatik.uni-leipzig.de/~graebe`

June 2022

Storytelling and Action

Our actions are closely related to the stories which we are permanently telling in parallel to each other.

- ▶ With these stories we transcend *our own world of experience* that is only a small part of THE WORLD. And we can grasp it only selectively.
- ▶ Storytelling is the form in which we make other people's worlds of experience accessible for us.
- ▶ This requires the *coordination of our conceptual worlds*.
- ▶ The *purpose* of the exchange of ideas is to *agree on cooperative action*.

Storytelling and Action

The (cooperative) changes of the world are preceded by speaking about these changes (the imagination of the change).

▶ Thinking and Doing: Justified expectations →
  World-changing cooperative action → Experienced results
▶ Concurrency of cooperate actions.
▶ In the tension between justified expectations and experienced results the ceasefire lines of the WORLD become visible.

Storytelling and Action

But how change a world that is also constantly changing by itself?

- ▶ Culture: Change the way the world (nature) is changing.
- ▶ Technology (tool perspective) and storytelling (perspective of expectations and experiences) are two essential moments of such an understanding of culture.
- ▶ Technology comes in here as *general processual knowledge*.
- ▶ It is only possible to apply it (consciously) *in specific contexts*.
- ▶ Separation of goals and means in modern society is a specific form of storytelling.
- ▶ The widespread separation of these two moments causes essential problems to understand the unity of the reality.

Storytelling and Digital Change

- ▶ Within the digital change new forms of storytelling are developing, which break up the previously institutionalised procedures of storytelling.

- ▶ Web 1.0 – Linked websites as a new form of storytelling.

- ▶ Semantic Web – RDF as a new basic technology to operate a certain kind of storytelling with computer support.

- ▶ Digitisation of important language artifacts. Examples from the German Digital Universum:
  - ▶ German Digital Library (Deutsche Digitale Bibliothek – Kultur und Wissen online)
    `https://www.deutsche-digitale-bibliothek.de/`
  - ▶ Europeana – `https://www.europeana.eu/de`
  - ▶ Digital Library at TextGrid –
    `https://textgrid.de/digitale-bibliothek`
  - ▶ Zeno.org, a full text library – `http://www.zeno.org/`

Storytelling and Digital Change

What social infrastructure conditions are required in order to develop this potential?

- ▶ Pilar 1: *Free* (as in free speech) **access to the knowledge** resources of the mankind, to communicate prospects of expectation and experience in an appropriate way.
- ▶ Pilar 2: **Acting** in a civil society as responsible *private* action, in which the consequences of action are privately assigned is a cultural achievement. This includes the ability to close contracts, liability, ownership, and institutionalised checks and balances in their historical evolution.
- ▶ The digital change requires a new balance between these two pilars. In the legal context of a civil society that means above all the readjustment of its *legal* constitution and framework.

Information and Language. Linguistics

What is Language?

It is obviously about processes mediated by language (including computer language). How does language work? What does linguistics say about this?

> *Language, a system of conventional spoken, manual (signed), or written symbols by means of which human beings, as members of a social group and participants in its culture, express themselves. The functions of language include communication, the expression of identity, play, imaginative expression, and emotional release.*
> *(https://www.britannica.com/topic/language)*

Information and Language. Linguistics

`http://de.wikipedia.org/wiki/Sprachsystem`

The idea of how the **language system** is built depends on which language or grammar theory it is based. The different theories have mostly the following assumptions about the components of the language system in common:

▶ There are **linguistic units that are organised hierarchically** and reach from the smallest units, the sounds, to the phonemes, morphemes, words, parts of sentences, sentences up to texts and possibly to discourses.

▶ In this hierarchy, from the morphemes on the units have **additional to their form** a grammatical or lexical **meaning**.

▶ At each level of the hierarchy there are **rules** that determine which positions and combinations of units are allowed and which are not. This applies to both the linguistic forms and their meanings.

Information and Language. Linguistics

http://www.christianlehmann.eu/ling/lg_system/index.html

Formative and Significative Subsystems

The language system relates thoughts to sounds. This association is indirect in several ways: A language system cannot associate thoughts ... and also not sounds ... but only linguistic units with each other. These are on the one hand **Significata** (the thought as content of the sign) and on the other hand **Significantia** (the sound as expression of the sign).

Hence the language system contains **two formative subsystems**:

- ▶ In **Semantics**, the thought is formed into a significatum.
- ▶ In **Phonology**, the sound is formed into a significant.

Information and Language. Linguistics

(cont.)

In addition to these formative subsystems, there is the **Significant Subsystem**, which combines Significantia and Significata and thus creates **Language Signs**. ... It is divided into two subsystems:

► Finalised language signs are stored in the **lexicon**.

► New language signs are formed in the **grammar**.

Information – a new Phlogiston?

What is Information?

- ▶ Inflationary use of the term information.
  - ▶ Günter Ropohl remembers the times when there was a counter "Auskunft" at a German railway station. (Source: Klemm 2003)
- ▶ The computer scientists stick to an ontologising (and ultimately a tangible) concept of information.
- ▶ The linguists talk about language practices.

Another critical debate occured in the late 1990s

- ▶ Capurro's Trilemma
- ▶ Trialog (Capurro, Fleissner, Hofkirchner): Is a unified theory of information feasible?
- ▶ Heinz Klemm (2003): "A great misery" (German: "Ein großes Elend")

Information – a new Phlogiston?

Peter Janich: The concept of information has necessarily to refer to successful human communication.

> *However, for successful prompting practices it is fundamental that through them a successful connection is established for the involved people between the (language) act of prompting and (non-language) act of obeying. (Janich 1998)*

> *Grundlegend für gelingende Aufforderungspraxen ist jedoch, dass durch sie eine für die beteiligten Personen gelingende Verbindung der (sprachlichen) Handlung des Aufforderns und der (gegebenenfalls nicht-sprachlichen) Handlung des Befolgens stattfindet.*

Information – a new Phlogiston?

Raphael Capurro:

What I am criticising is the idea to have by the reductionistic concept of information a kind of phlogiston: To mean that one comes through the different levels – Aristotle called this logical error metabis eis allo genos – and thus to believe e.g. better to explain how life arises from matter. So we are not far from the use of the concept of form – informatio originally goes back to forma and eidos – in relation to matter, life, soul, etc. We would be faced with a new or old form of metaphysics.

Was ich kritisiere ist die Vorstellung, durch den reduktionistischen Informationsbegriff hätte man eine Art Phlogiston: man kommt durch die verschiedenen Ebenen – Aristoteles nannte diesen logischen Fehler metabis eis allo genos – und glaubt damit z.B. wie aus Materie Leben entsteht besser erklären zu können. Damit sind wir nicht weit von der Verwendung des Formbegriffs – informatio geht ursprünglich auf forma und eidos zurück – in Bezug auf Materie, Leben, Seele usw. Wir hätten es mit einer neuen oder alten Form von Metaphysik zu tun.

Information – a new Phlogiston?

The problem is once again: Where is the human being as an *acting* subject?

Klaus Fuchs-Kittowski stated already in the 1980s:

> *The concept of unity of self-organisation and generation of information – the information processing approach neglects the formation of meaning in the process of real life.*

> *Das Konzept der Einheit von Selbstorganisation und Informationsentstehung – Der Informationsverarbeitungsansatz vernachlässigt die Bedeutungsbildung im Lebensprozess.*